

Homework 2

CMSY-217, Spring 2011

The source code and sample output for this assignment must be submitted electronically using the CE6 course website prior to the start of class on Thursday, March 10.

1. Write a Java class called **Canasta** which belongs to the package which is the reverse of your HCC email address. For example, my **Canasta** class would belong to the package **edu.howardcc.mikemiller**.
2. Make the following modifications to the classes of Fig. 20.10:
 - (a) Move the **Card** class to a separate file and change its access modifier to **public**
 - (b) Move the **main** method from the **DeckOfCards** class to the **Canasta** class
3. Make the following modifications to the **Card** class:
 - (a) Implement a **Comparable<Card>** interface where the natural ordering is based on the face of each card and corresponds to the order in which they appear in the **Face** enumeration
 - (b) Add the capability to create **Card** objects which represent Jokers and make them the largest in the natural ordering
 - (c) For the **toString** method, a Joker should simply return the string **Joker**
 - (d) Add a method to return an **int** which represents the point value of each card based on the following table

Card	Point Value
red 3 (hearts or diamonds)	100
Joker	50
A, 2	20
8, 9, 10, J, Q, K	10
black 3 (clubs or spades), 4, 5, 6, 7	5

4. Make the following modifications to the **DeckOfCards** class:
 - (a) Add a one-argument constructor which takes an **int** indicating the number of Jokers in the deck
 - (b) Write a no-argument constructor which calls the one-argument constructor to create a deck with no Jokers
 - (c) Instead of obtaining a **List** view of the array in the constructor, pass **Arrays.asList(deck)** to the **LinkedList** constructor to create a new **List**

- (d) Write a method called `combine` which takes a `DeckOfCards` object as an argument, combines the current deck with the argument, shuffles the combined deck, and then returns the combined deck
 - (e) Write a method which deals one card from the top of the deck; It should actually remove the `Card` from the instance variable `list` and return it to the caller
5. Write class called `Hand` which represents a hand that been dealt to a player. It's internal design might be similar to the `DeckOfCards` class. The `Hand` class should include methods to add a card, sort the cards, return the total of the point values of the cards, and print the cards in the hand.
6. Write code in the `main` method of the `Canasta` class for a four-player game of Canasta. You are *not* required to implement the entire game. At a minimum, you should at least do the following:
- (a) Create two decks of cards with two Jokers in each
 - (b) Combine the two decks into one and shuffle the combined deck
 - (c) Create an empty hand for each of the four players
 - (d) Deal the cards, one card at a time to each player, until each of the four players has eleven cards
 - (e) Print the cards each of the four hands along the the total point value of the cards in each hand

Make use of objected-oriented programming techniques in your design and utilize the classes and methods from the Java Collections Framework as much as possible.

7. The rules for Canasta are available online. Two excellent sources of information are: <http://games.yahoo.com/help/rules/ca>; and http://en.wikipedia.org/wiki/Canasta#Rules_for_original_Canasta

Sample output which demonstrates the minimum requirements:

Player 1: 245

Ace of Hearts	Deuce of Clubs	Three of Hearts	Four of Clubs
Four of Spades	Four of Clubs	Eight of Clubs	Ten of Clubs
King of Spades	King of Diamonds	Joker	

Player 2: 105

Ace of Hearts	Deuce of Clubs	Four of Hearts	Five of Clubs
Five of Hearts	Seven of Clubs	Seven of Clubs	Ten of Diamonds
Queen of Clubs	Queen of Diamonds	Queen of Spades	

Player 3: 125

Deuce of Diamonds	Deuce of Hearts	Deuce of Spades	Five of Hearts
Five of Diamonds	Six of Spades	Nine of Clubs	Nine of Diamonds
Jack of Hearts	King of Diamonds	King of Hearts	

Player 4: 195

Ace of Spades	Deuce of Hearts	Three of Clubs	Four of Hearts
Seven of Spades	Eight of Spades	Nine of Hearts	Ten of Hearts
King of Hearts	Joker	Joker	